



Service Manual



SELF PROPELLED CHIPPER VAC - CSV 070

NOTE: These materials are for use by trained technicians experienced in the service and repair of outdoor power equipment of the kind described in this publication, and are not intended for use by untrained or inexperienced individuals. These materials are intended to provide supplemental information to assist the trained technician. Untrained or inexperienced individuals should seek the assistance of an experienced and trained professional. Read, understand, and follow all instructions and use common sense when working on power equipment. This includes the contents of the product's Operators Manual, supplied with the equipment. No liability can be accepted for any inaccuracies or omission in this publication, although care has been taken to make it as complete and accurate as possible at the time of publication. However, due to the variety of outdoor power equipment and continuing product changes that occur over time, updates will be made to these instructions from time to time. Therefore, it may be necessary to obtain the latest materials before servicing or repairing a product. The company reserves the right to make changes at any time to this publication without prior notice and without incurring an obligation to make such changes to previously published versions. Instructions, photographs and illustrations used in this publication are for reference use only and may not depict actual model and component parts. © Copyright 2005 MTD Products Inc. All Rights Reserved.

MTD Products LLC - Product Training and Education Department

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Self-propelled Chipper Shredder Vacuum

ABOUT THIS SECTION:

In model year 2000, MTD introduced a vertical crankshaft lawn vacuum with a 22" clearing width and the capacity to shred small yard debris. Since its introduction, the product has been enhanced with a removable vacuum hose. The latest product improvement is the addition of a self-propell feature.



NOTE: The equipment that was used to write this section was a prototype. There may be subtle differences between prototypes and production equipment.

For the sake of orientation:

- All engine controls are located on the engine.(i.e. choke and throttle)
- The variable speed lever is on the left side of the handle. This is NOT a throttle control.
- The variable speed lever will not move easily unless the engine crankshaft is rotating. Do NOT force the lever.
- The control Bail mounted to the handlebar engages the drive system. It does NOT turn-off the engine like the blade control handle on a mower.

1. SAFETY SWITCH

The safety switch is located at the rear of the unit. The intent is to make sure that it will not run without a collection bag or blower chute in place. The safety switch is a normally closed switch. This means that when the bag or chute are not present, the plunger will be up, and the contacts within the switch will be closed.

The switch is mounted to the upper impeller housing assembly. A magneto primary wire connects to one terminal of the safety switch. The other terminal of the safety switch is connected to a ground wire. When the collection bag or blower chute is on the unit, the safety switch plunger will be depressed, and the contacts will be separated.

NOTE: A multimeter or continuity tester can be used for this section.

- 1.1. Confirm that the metal tab on the collection bag or chute depress the plunger far enough to open the contacts in the switch.
- 1.2. Disconnect the switch from the magneto primary wire at the bullet connector.
- 1.3. Check for continuity through the switch, from the bullet connector to ground. See Figure 1.3.



Figure 1.3

NOTE: In figure 1.3, the meter shows continuity (near 0 ohms). This engine will not start even though the bag is in place.

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- 1.4. If slight pressure on the tab breaks continuity, adjusting the tab by bending it downward will enable the switch to work correctly. See Figure 1.4.

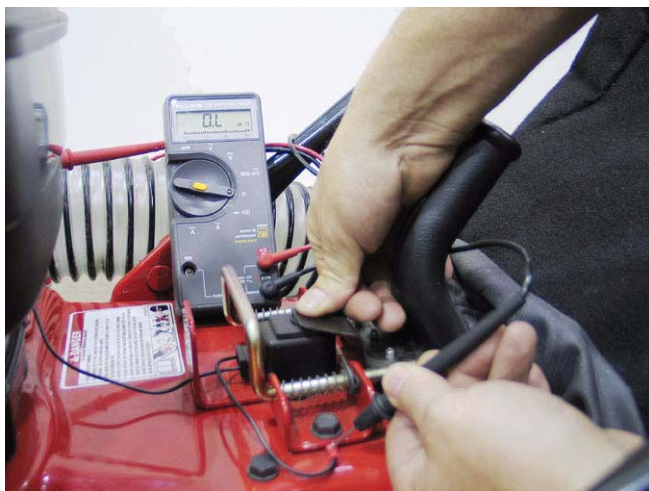


Figure 1.4

- 1.5. If the switch does not break the ground path (meter reading: near 1.0 ohms, or “OL” indicates open contacts, breaking ground path) when the plunger is pressed, replace the switch.
- 1.6. The switch should complete a path from the magneto to ground when the plunger is up. See Figure 1.6.



Figure 1.6

NOTE: If the switch fails to ground out the magneto when the plunger is up, it would be possible to run the engine without a blower chute or collector bag in place. This is unsafe.

- 1.7.

- 1.8. If the switch fails to ground the magneto, identify if the switch itself is at fault, or if a bad connection exists between the switch and ground.

NOTE: A lock tab secures the plug to the switch. The switch must be removed to reach the lock tab.

- 1.9. Remove the switch from the frame using a 5/16” wrench or driver. See Figure 1.9.

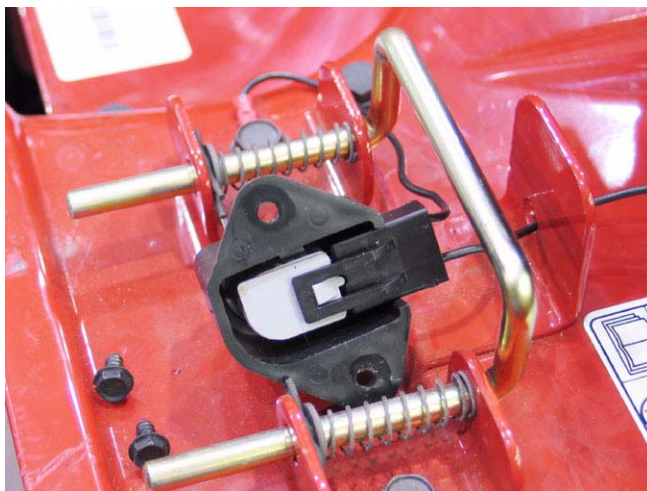


Figure 1.9

- 1.10. Test the switch independently. It should show continuity with the plunger up. See Figure 1.10.



Figure 1.10

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- 1.11. The switch should not show continuity when the plunger is pressed. See Figure 1.11.



Figure 1.11

NOTE: “OL” meter reading in Figure 1.11 indicates no continuity. Other meters may read near 1 ohm.

- 1.12. If the switch works correctly, but does not ground the magneto, the problem lies in the wiring or the ground connection.
- 1.13. Do not return a machine to service unless this safety feature works correctly.

2. INSPECTION OF THE DRIVE SYSTEM

- 2.1. Begin with an operational test. Does the drive system operate over the full range of speeds?
- 2.2. Remove belt cover using a 3/8” wrench. See Figure 2.2.



Figure 2.2

- 2.3. Inspect variable speed pulley for full movement. Run the self propel mechanism through its full range of speeds. See Figure 2.3.

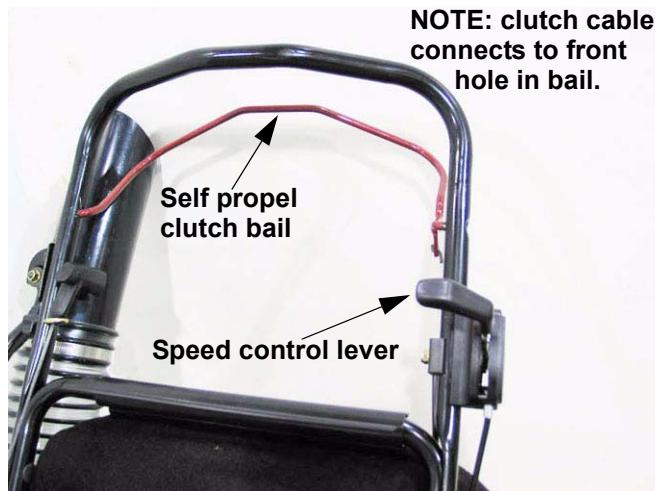


Figure 2.3

- The crankshaft must be turning for the variable speed mechanism to respond to the control lever. This can be done with the engine running or by pulling the engine through manually.
- The belt and pulley system operates whenever the engine is running. The variable speed function can be tested without pulling up the self-propel bail to engage the clutch.

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- 2.4. Watch the travel of the variable speed sheave (pulley) on the input shaft. It may be necessary to remove the belt to confirm that the variable speed sheave has full travel. See Figure 2.4.

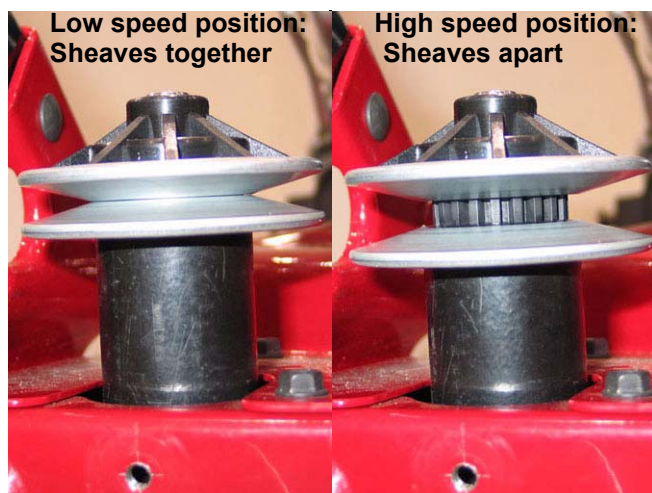


Figure 2.4

NOTE: Belt removed for clarity in figure 2.4

- 2.5. Confirm that the belt is routed properly.
- 2.6. Watch the reaction of the two idler pulleys. If the bracket that they are mounted to does not pivot freely in response to the changes in belt tension created by the movement of the variable speed sheaves, the full range of speeds will not be available, and accelerated component wear will result. See Figure 2.6.

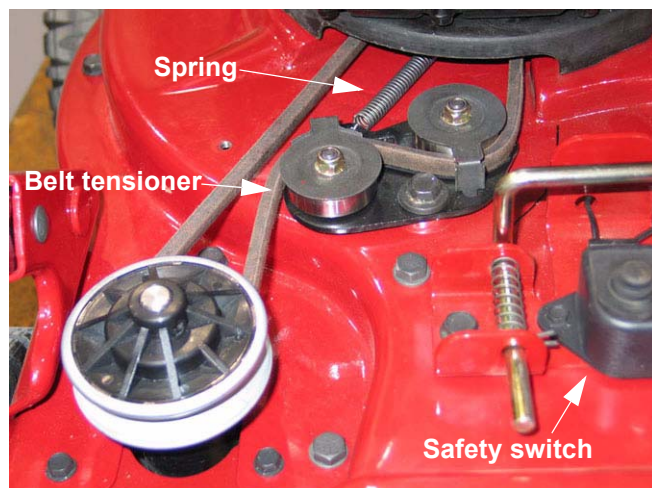


Figure 2.6

- 2.7. If the idler pulleys do not react properly, confirm that the spring is properly attached to tension bracket and spring anchor bolt. See Figure 2.7.

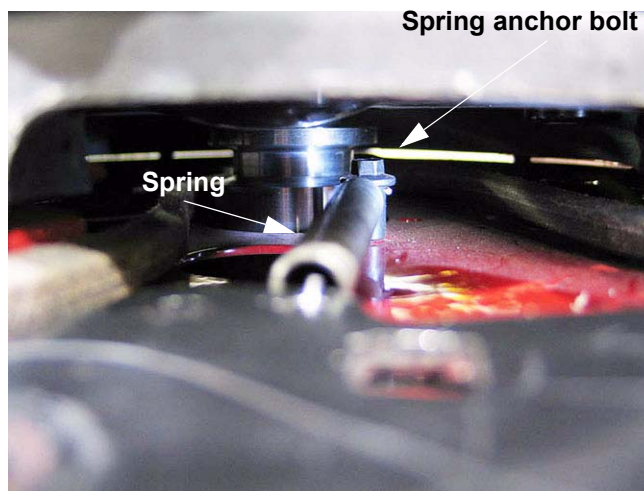


Figure 2.7

- 2.8. If the belt and pulley system works properly, turning the variable speed sheave on the transmission input shaft, but fails to drive the wheels when the self propel bail is lifted, then there may be a problem in one of three areas:
- The cable that connects the bail to the clutch mechanism.
 - The final drive gears within the wheels.
 - There may be an internal problem with the dog clutch in the transmission. If there is an internal transmission problem, replace the transmission.
- 2.9. To check the final drive gears, remove both rear hubcaps. Remove the rear wheels using a 9/16" wrench and a 1/2" wrench.
- 2.10. Check the condition of the teeth on the back of the wheel.

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- 2.11. Confirm that the drive gears are installed on the correct side. See Figure 2.11.



Figure 2.11

NOTE: There is an "R" on the right side gear and an "L" on the left side gear.

- 2.12. Remove retaining ring and gear to assure dowel pin is in place. See Figure 2.12.

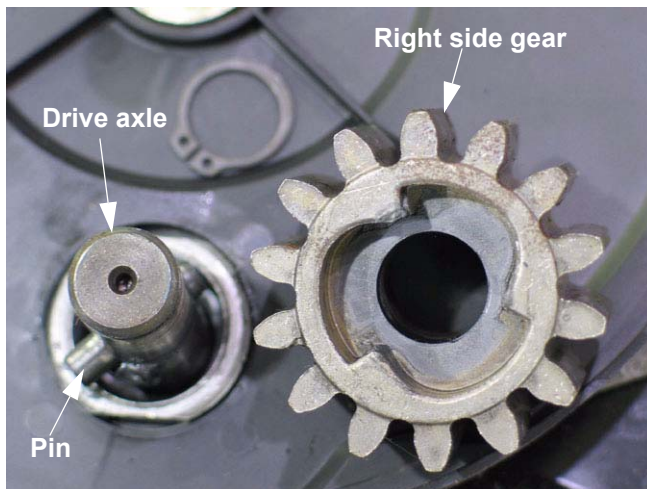


Figure 2.12

NOTE: The pin must be free to slide back and forth. This provides a ratcheting action.

NOTE: Apply anti-sieze to pin to ensure proper ratcheting action.

3. TRANSMISSION REMOVAL

- 3.1. Disconnect the H.T. lead from the spark plug.
- 3.2. Remove collection bag or blower chute.
- 3.3. Remove vacuum hose if attached.
- 3.4. Using a 3/8" socket, remove the 3 self tapping screws securing the belt cover. See Figure 3.4.

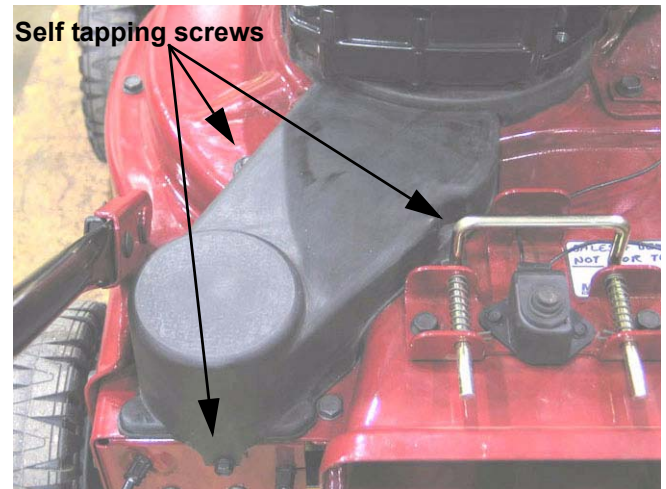


Figure 3.4

- 3.5. Insert a 3/8" breaker bar and extension into the square hole of the tensioner arm. See Figure 3.5.

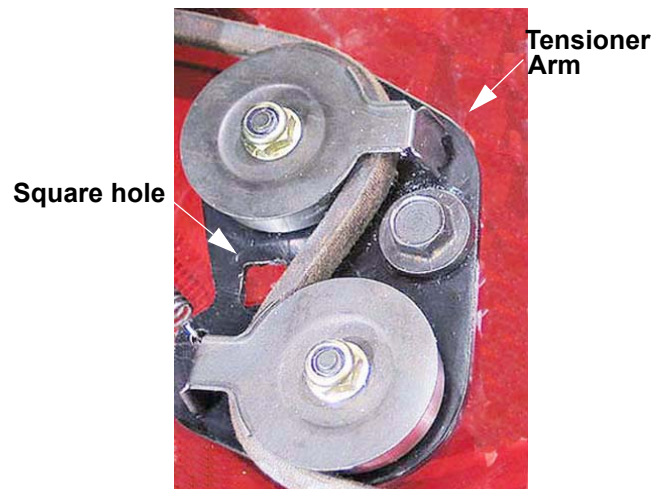


Figure 3.5

- 3.6. Pull the breaker bar rearward until the drive belt can be slipped over the variable pulley easily

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- 3.7. Safely support rear of the unit so that the rear wheels are off the ground, and remove rear hub caps. See Figure 3.7.

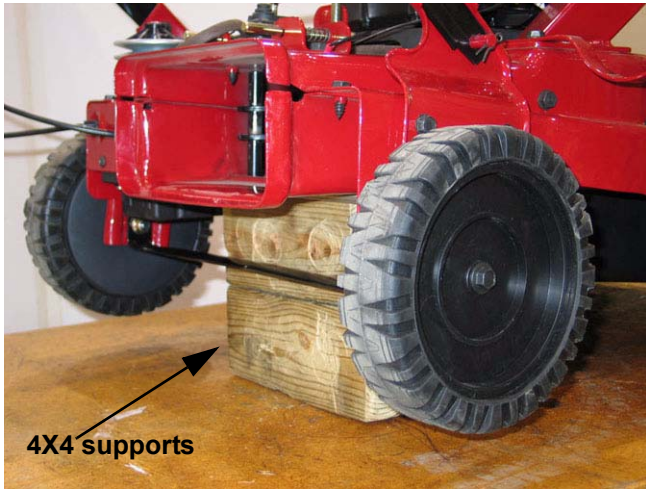


Figure 3.7

- 3.8. Using a 1/2" wrench and a 9/16" wrench remove the shoulder bolts, washers, and rear wheels. See Figure 3.8.

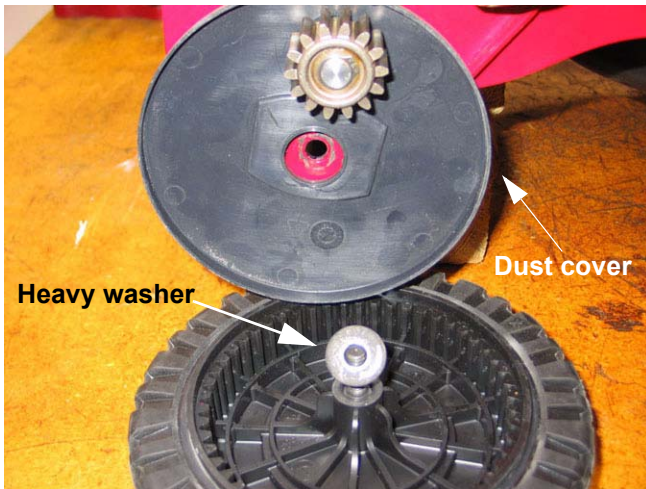


Figure 3.8

NOTE: A heavy washer goes between wheel and outside of frame.

- 3.9. Cross-bar is also secured by the rear wheel shoulder bolts. It can be removed as the rear wheels are removed.

NOTE: The rear cross bar is shorter than the front cross bar.

- 3.10. Remove retaining ring holding drive gear and dowel pin on axle. See Figure 3.10.

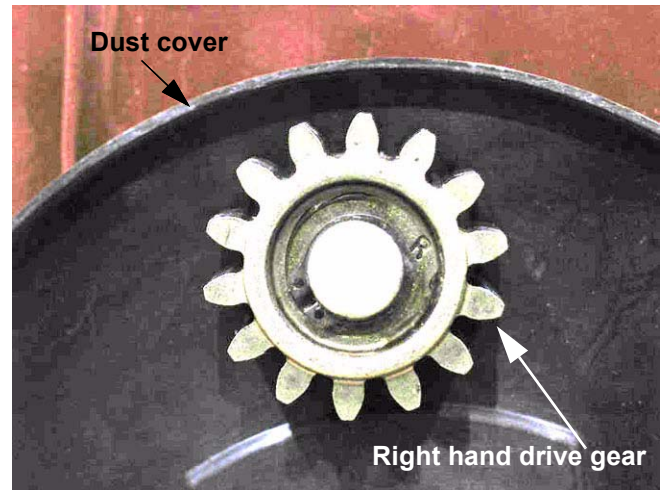


Figure 3.10

NOTE: There are right hand and left hand drive gears

- 3.11. Remove dust cover

NOTE: Rim on dust cover faces outboard

- 3.12. Remove E-clip and flat washer from axle. See Figure 3.12.

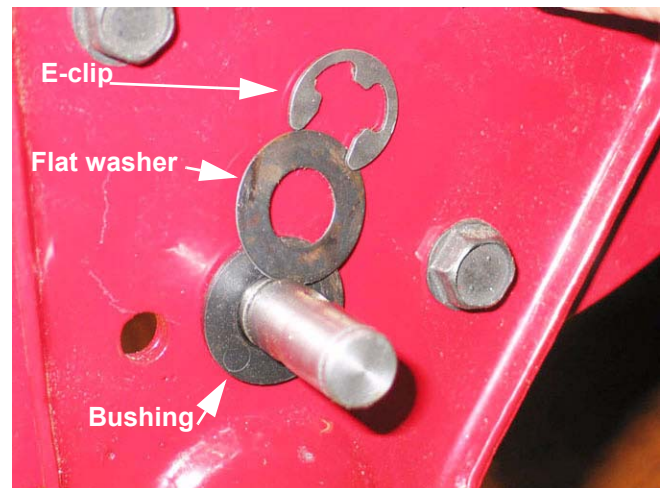


Figure 3.12

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- 3.13. Remove three self tapping screws holding transmission brace to the frame using an 3/8 socket.
- 3.14. Remove the two phillips screws holding the transmission to the brace. See Figure 3.14.

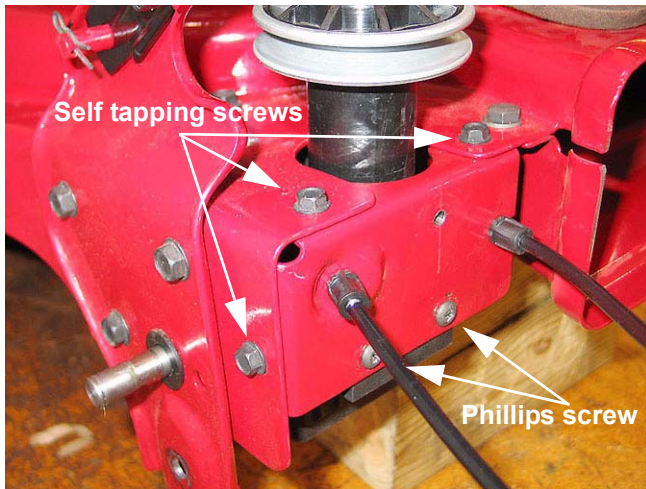


Figure 3.14

- 3.15. Remove barbed fitting holding the variable speed cable to the transmission bracket. See Figure 3.15.

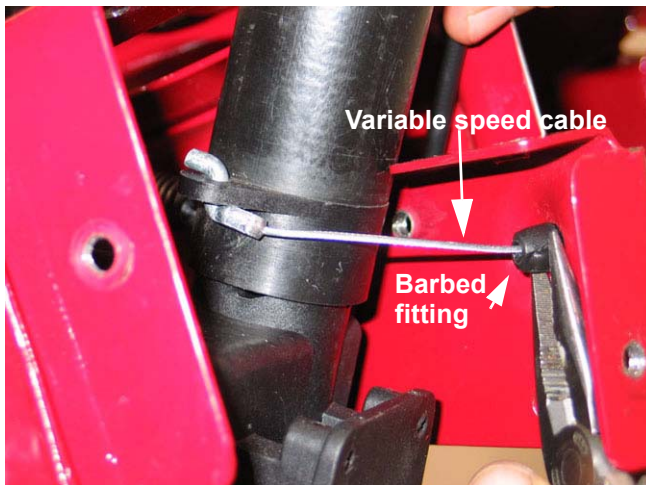


Figure 3.15

- 3.16. Disconnect Z-fitting from transmission using needle nose pliers (This is the variable speed cable).
- NOTE:** Rotating the collar counter-clockwise will aid in removal.
- NOTE:** Z-fitting must be installed from the bottom of the speed control collar.

- 3.17. Remove spring from transmission actuating arm. (This is the self propel clutch cable) See Figure 3.17.

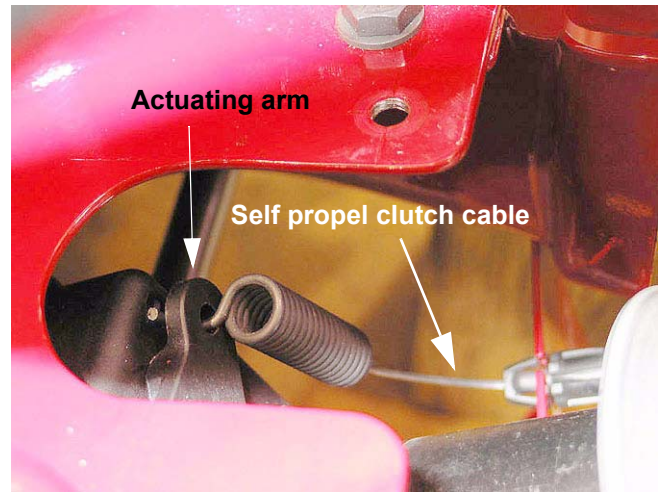


Figure 3.17

- 3.18. Push the hexagonal drive axle bushings out of each side of frame. See Figure 3.18.

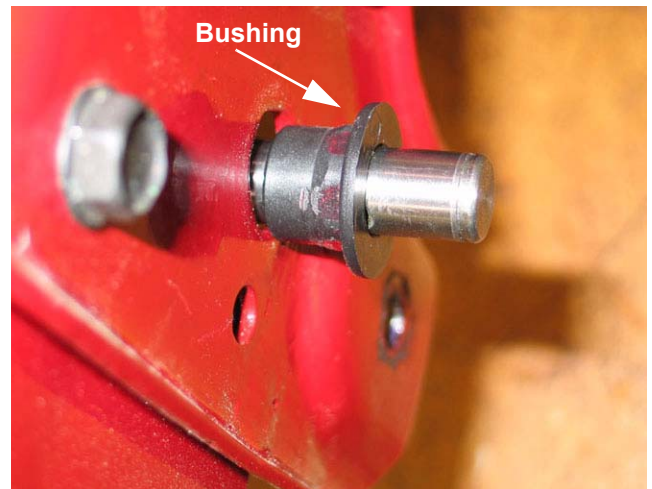


Figure 3.18

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- 3.19. Pivot transmission rearward while sliding it to the right. See Figure 3.19.

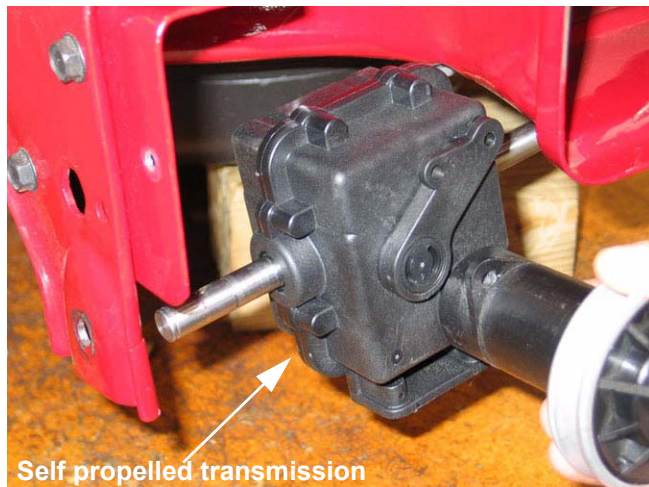


Figure 3.19

- 3.20. Once the left side comes out, slide the transmission to the left. At this point the transmission will be solely in your hands
- 3.21. Install new transmission in opposite order that was taken out.

4. IMPELLER AND BELT REMOVAL

- 4.1. Disconnect the H.T. lead from the spark plug.
- 4.2. Remove the transmission as described in the **TRANSMISSION REMOVAL** section of this manual.
- 4.3. Safely tilt and support the front of unit to provide access to the front wheel and nozzle mounting hardware.
- 4.4. Remove the hub caps.
- 4.5. Remove front wheels using an 1/2 wrench.
- 4.6. Using a 15/16" wrench and a 9/16" wrench remove height adjusters and cross bar. See Figure 4.6.

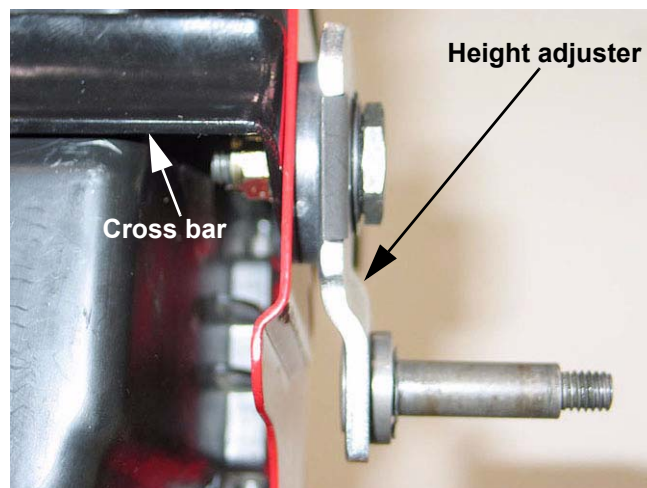


Figure 4.6

NOTE: The front cross bar is longer than the rear cross bar

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- 4.7. Use a 1/4" wrench to remove the three Screws securing the black plastic nozzle to the lower housing. They are accessible from underneath. See Figure 4.7.



Figure 4.7

- 4.8. Four phillips head screws secure the front of the nozzle to the frame. Remove them. See Figure 4.8.



Figure 4.8

- 4.9. Tilt top of black plastic nozzle toward the engine to remove. This will allow the safety gate to pass by the hose opening freely. See Figure 4.9.

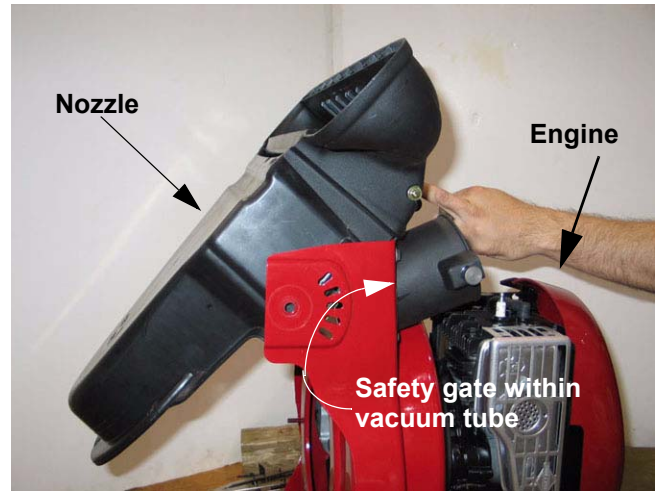


Figure 4.9

- 4.10. Remove all of the fasteners holding the lower housing to the upper housing. See Figure 4.10.

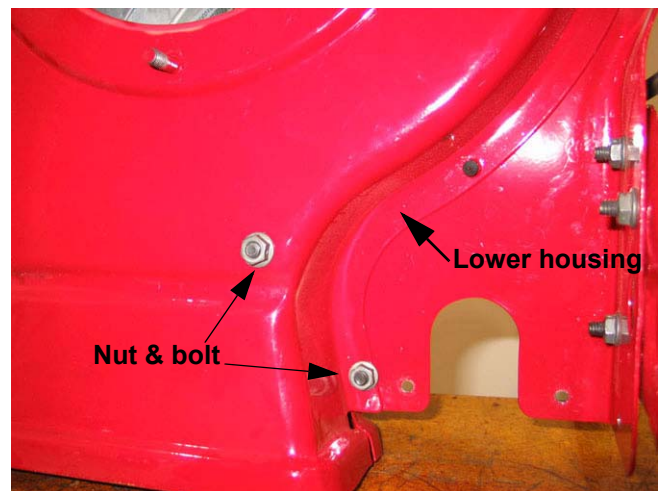


Figure 4.10

NOTE: There is a variety of nuts, bolts, and self-tapping screws holding the two housings together.

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- 4.11. Block the impeller with a chock, to keep it from rotating. Using a 9/16" socket, remove the bolt, lock washer, and flat washer securing the impeller to the crankshaft. See Figure 4.11.

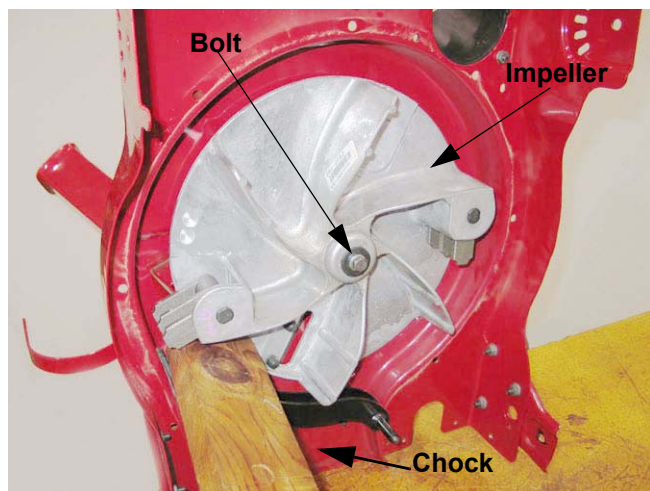


Figure 4.11

- 4.12. Lubricate the impeller removal tool (part number 753-0638). Thread the tool into the crankshaft until the impeller assembly can easily slide off the crankshaft.

NOTE: Push the belt forward to create slack, releasing the belt from the groove in the pulley hub.

- 4.13. Inspect impeller, pulley hub, chipper blade, and flails for any damage, replace as needed.

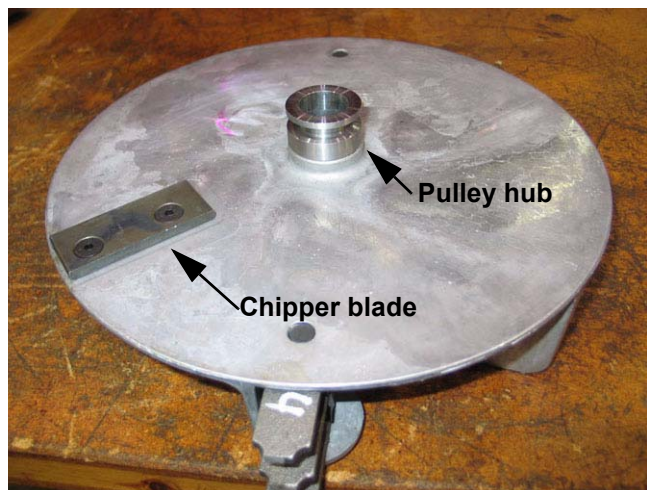


Figure 4.13

- 4.14. Do not use an impeller that shows any signs of damage. A burst hazard will result.

- 4.15. In servicing the impeller:

- The pulley hub can be pried off and replaced or reused.
- The Chipper blade can be replaced without removing the impeller. Refer to **CHIPPER BLADE REMOVAL** section of the manual.
- The roll pins secure the clevis pins that mount the flails. The roll pins are shielded by pin clips.

- 4.16. Pull belt through hole surrounding the crankshaft to remove it.

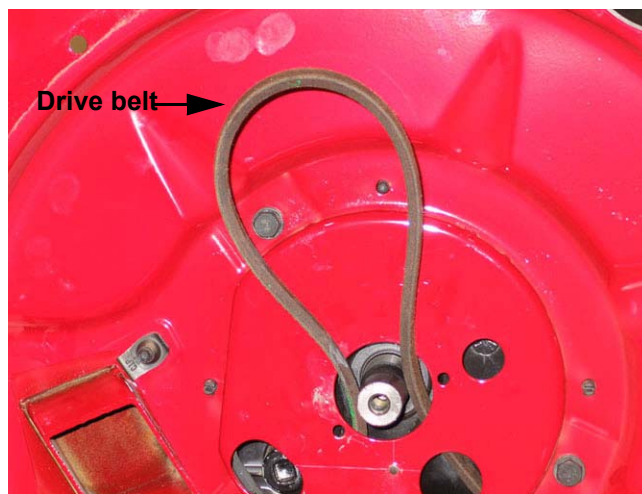


Figure 4.16

- 4.17. Install a new belt through the hole surrounding the crankshaft.

NOTE: When installing impeller make certain belt is seated in the pulley groove.

NOTE: Torque the impeller bolt to 375 to 425 inch pounds.

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5. CHIPPER BLADE REMOVAL

- 5.1. Disconnect H.T. lead from the spark plug.
- 5.2. Remove the three bolts holding the chipper chute to the upper housing. See Figure 5.2.

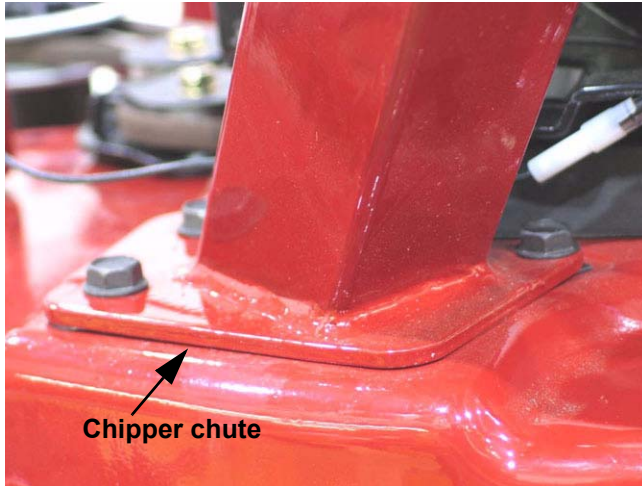


Figure 5.2

- 5.3. Remove the black plastic nozzle as described in the **BELT AND IMPELLER REMOVAL** section of this manual. See Figure 5.3.

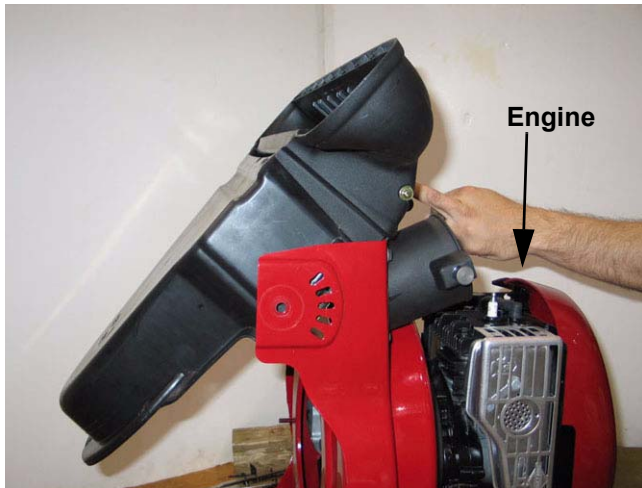


Figure 5.3

- 5.4. Using 3/16" allen wrench, remove the flat head cap screw that holds the chipper blade to the impeller. It is accessible through the opening created by removing the chipper chute. See Figure 5.4.



Figure 5.4

- 5.5. The nuts on the flat head cap screws can be reached using a 1/2" socket, universal, and extension. See Figure 5.5.

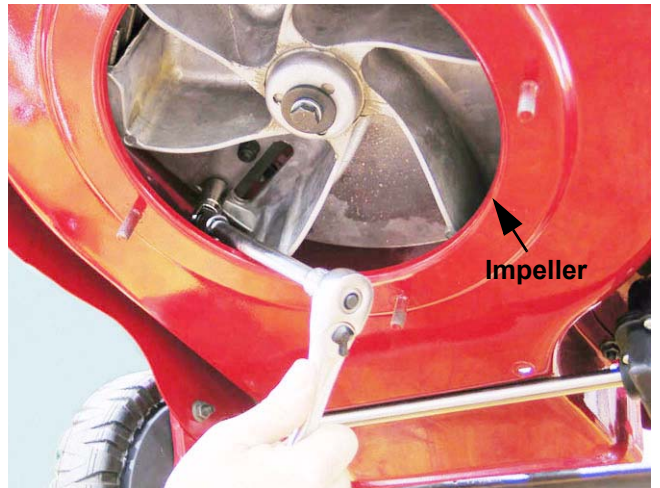


Figure 5.5

NOTE: On installation, torque the chipper blade to 210 - 250 inch pounds.